



ERDC MSRC PET Preprint No. 01-30

**High Performance Computing Summer Intern Program
Summer 2001 Final Report**

by

John E. West

24 September 2001

**Work funded by the Department of Defense
High Performance Computing Modernization Program
U.S. Army Engineer Research and Development Center
Major Shared Resource Center through**

Programming Environment and Training

Supported by Contract Number: DAHC94-96-C0002
Computer Sciences Corporation

Views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of Defense position, policy, or decision unless so designated by other official documentation.

High Performance Computing Summer Intern Program Summer 2001 Final Report

John E. West, Computer Sciences Corporation
U.S. Army Engineer Research and Development Center
Major Shared Resource Center
Vicksburg, MS

24 September 2001

Background

The High Performance Computing (HPC) Summer Intern Program began as a concept to expand the summer intern program at the U.S. Army Engineer Research and Development Center (ERDC) Major Shared Resource Center (MSRC). The summer intern program provides several benefits to both the center and the students involved. First, the MSRC directly benefits from the application of the interns' talents to real challenges within the MSRC. Second, the MSRC has a unique opportunity to capture students at various stages in their academic careers. This benefits the MSRC in terms of identifying potential future staff, and also benefits the HPC community in general. Third, the MSRC has the opportunity to broaden the exposure of students to real-world applications of science and engineering, furthering their education and contributing to the enrichment of university programs. Finally, the ERDC has a long history of leadership in these types of programs, and the HPC Summer Intern Program fits well within that heritage.

For several years, the MSRC Programming Environment and Training (PET) program has sponsored a targeted intern program with Clark Atlanta University, a Minority Serving Institution (MSI). This program has brought three different students over four summers to the MSRC. This program has been very successful, yielding real results that have been applied to MSRC challenges. The MSRC PET program has also sponsored several other student experiences, including the Summer Institute for High Performance Computing hosted by Jackson State University (JSU), the lead MSI in the ERDC PET program.

These programs have been very successful for both the center and for the students, and the Summer 2001 efforts proposed to expand the existing summer intern program to include 4-5 students at various stages (graduate and undergraduate) of their academic careers. It was important to evolve the program to more than a single student to create a critical mass of interns and foster internal support groups and a strong *esprit-de-corps*, enhancing the summer experience for the students. The goal in selecting these students was to recruit approximately half of the interns from MSIs, with preference given to in-state institutions to emphasize community bonds.

The operational model for the intern program is to pair students one-on-one with mentors within the MSRC. Potential areas for these students include all the areas of Scientific Computing – the Scientific Visualization Center, the Computational Science and

Engineering (CS&E) group, and PET – with placement in other areas of the MSRC depending upon the talents of any particular candidate. Emphasis is placed on applying the interns to address real challenges and issues faced by the MSRC and its users, as well as on having definite work product.

Each intern began the summer with a set of goals and a plan for achieving them. Upon conclusion of the internship, each student produced a written report. Throughout the summer, the students attended a series of lectures given by MSRC staff on topics that introduced the various facets of high performance computing. Students were also given a number of formal and informal opportunities to meet with the center staff. Such interactions are key to achieving a broad educational experience for the students; the goal was to expose the students to as many different facets of the organization as possible to supplement the experience of focusing in their target area during the summer.

The information packet in Appendix A provides details of the application process and compensation model for the HPC Summer Intern Program. This model is based upon the ERDC contract student model, and compensates students based upon the level of academic training they have completed. There are two categories for undergraduates, one for master's students, and one for Ph.D. students. In order to make the salary competitive, the MSRC also offered to reimburse travel and living expenses for those students who traveled from out of town and set up a household in Vicksburg during the summer.

Summer 2001

Applicants

The MSRC received 15 applications for four open positions; the remaining position for Richard Anderson of Clark Atlanta University was already filled by a focused effort. Applications were received from Mississippi State University, Alcorn State University (MS), Tougaloo College (MS), Rust College (MS), and the University of Texas. In anecdotal comparisons of the response of ERDC's program with similar university programs, ERDC's response rate was very high, especially given that the program was not advertised externally until 6 weeks before the applications were due.

This success is attributed to including a travel benefit to supplement the summer stipend, and to the advertising model. In spreading the word about the program, its coordinators worked personal relationships with department heads and instructors from target universities (primarily MSIs in Mississippi). These contacts then in effect became local champions for the program, and recruited the best of their students directly. This seems to be much more effective than "blanket" advertising techniques that traditionally gain limited response, especially for new programs. Also, waiting until roughly 6 weeks before the end of the academic year actually worked in the program's favor; the summer was close enough to be "real" to most students, but still far enough away that plans were not yet definite for most.

Student Selection and Program Administration

The collection of applications was surprisingly strong, and the ERDC MSRC ultimately extended offers to five applicants. This would have meant six interns over the summer and slightly more than had originally been planned. In the end, however, one of the

candidates accepted a position in another program, bringing the total number of summer 2001 interns to five, as summarized below:

Eddie Barnes	Alcorn State University (MSI)	Undergraduate (Junior), Industrial Technology	Scientific Visualization Center/ Paul Adams
Joyce Beal	Alcorn State University (MSI)	Undergraduate (Senior), Industrial Technology	Computational Grid Project/ Dan Duffy
Richard Anderson	Clark Atlanta University (MSI)	B.S. Graduate, Computer Science	PET Training Technologies/ Wayne Mastin
David O’Gwynn	Mississippi State University	M.S. Candidate, Computational Engineering	PET CFD/ Nathan Prewitt
Owen Eslinger	University of Texas	Ph.D. Candidate, Mathematics	EQM/ Fred Tracy, Stacy Howington

The interns were matched with a functional area in the MSRC by first identifying the candidate groups and then having the lead in each area review the interns’ resumes in order to find the best possible match with the students’ talents.

The desire was to start all students at the same time, to encourage bonding as a group, and allow staggered departures to accommodate each student’s personal plans and differences in semester start dates for the various universities. In the end, some flexibility on the start date was allowed to accommodate Owen’s examination schedule. Owen started in mid-June, while the rest of the students started at the beginning of June. Because of the large difference in Owen’s experience compared with that of the other interns, not much was lost by allowing him to start later. One lesson learned from this experience is that rigid adherence to a predefined model will not create a rewarding experience for everyone, and some flexibility is required to allow both the students and the MSRC to gain the full benefit of this program’s goals.

A motivated support team is absolutely critical in getting a program such as this going. Substantial administrative resources were used in drafting, mailing, and coordinating offers, acceptances, and rejections with all of the applicants. After the candidates were selected and had accepted, there was still substantial coordination work to be completed in preparation for their arrival. Accounts for all interns had to be established, which at the ERDC MSRC involved a security clearance application for each intern. The security office coordinated this effort.

It was originally planned to fund all of the interns through focused efforts with their universities. This plan was abandoned, however, when a review with contracts revealed that establishing contracts for new focused efforts would require substantially more time

than was available. In order to fund the students, CSC's casual employee status was used to pay the students' stipend (based on hours worked with a maximum of 40 hours per week) and to reimburse travel expenses where appropriate. In order to accomplish this, the human resources staff had to rapidly complete the process of creating the position requisitions, extend offers to the interns, and manage the offer acceptance and new employee process. Substantial resources were also required throughout the summer to manage travel reimbursements and salary disbursements, as well as to track budget performance.

In addition to paperwork and corporate tasks, each intern also had to be provided with infrastructure during the summer. In addition to the necessary access badges, parking decals, and so forth, each intern was outfitted with office space (either in a cubicle or a shared office), a computer, corporate e-mail accounts, and a telephone.

Work Efforts

After the interns arrived and were interviewed by their mentors, a work plan was prepared for each intern to define specifically what the intern would accomplish over the summer. These plans were reviewed at the program level to assure that the intern was performing significant work in support of a user or center requirement, that the work was commensurate with the intern's experience, and that the effort was reasonable given the time frame. This section summarizes the projects and products for each student. A sample of actual comments received from each student is included; the comments are in response to a request at the end of the summer for their thoughts on the experience overall, with suggestions for improvement.

Eddie Barnes, Undergraduate

Eddie's plan included a variety of tasks to expose him to the breadth of activities performed in the MSRC's Scientific Visualization Center. These tasks included a basic introduction to three-dimensional (3-D) modeling with Alias|Wavefront's Maya application for computer animation; an overview of 3-D scientific visualization using Ensight to visualize a user's data and create a visualization movie sequence; and creating a database to archive and document all movies created in the visualization center.

"During the course of my time at the MSRC, I was able to learn a variety of things. I was able to have the type of experience that I was looking for. I was afforded the opportunity to discover the wonderful world of high performance computing. It was a wonderful privilege to become a part of the SciVis team this summer. In accord, I was exposed to valuable software programs such as Maya and Ensight. Because of this, along with working with technological geniuses, I got to see how all of the cool animation, visualization, and effects that you see in such movies as 'Toy Story' are actually made. Without this experience, I may have never known that so many things were possible with animation and visualization and the difference that seemingly minor details can make on a work of art. In addition, I performed the task of building a database that lists the videos held in the library of SciVis. Since that was something I'd never done before, I am grateful for the learning experience. Thanks to this and to the delight of a real job, my stay here was both educational and exciting; one I'll never forget and would like to experience again.

All in all, the program was great! I am glad that I was chosen to be a participant in it. I wish to thank all of the persons involved in getting me here, welcoming

me here, and making my stay enjoyable. This is the kind of environment I've always wanted to work in. I really hope that the program remains and continues to assist, if not myself, other students in their quests and aspirations of greatness. I don't think that many changes are necessary. I believe that the process will continue to grow over time. I am grateful to have been a part of it and I really hope that this isn't the last contact I have with MSRC or the last you see of me. Thank you once again."

Joyce Beal, Undergraduate

Joyce's plan was to study the current production environment at the ERDC MSRC with an eye toward the processes that users must go through in order to learn how to run both serial and parallel codes on high performance computers. Throughout the process of learning how to use the systems, Joyce created short tutorials and help pages in the form of HTML documents. The end result of her efforts is a collection of Web pages that will be added on the ERDC MSRC Web site to assist users in understanding and learning the working environment more efficiently.

In order to allow Joyce the flexibility to explore specific topics of interest to her during the summer, she and her mentor established the following list of potential topics, which gave her the freedom to explore those of interest to her:

- Types of HPCs
 - Distributed
 - Shared
 - Hybrid
 - Vector
- Kerberos and the SecurID Card
 - What is Kerberos and a short explanation of how it works.
 - kinit
 - kdestroy
 - Other commands
 - How do you work the SecurID Card?
- Unix
 - Basic grouping of commands
 - Directory manipulation
 - File manipulation
 - Other
 - Differences in shells
- Editing on HPC systems
 - vi
 - Basic explanation
 - Some commands
 - Cheat sheet
 - emacs
 - Basic explanation

- Some commands
 - Cheat sheet
 - Setting display variable
- Environment Variables
 - Explanation of common variables
 - \$HOME
 - \$WORKDIR
 - \$PATH
 - etc
 - How to change environment variables in different shells
 - Setting your display
- HTML
 - Creating a basic Web page
 - Understanding the style of ERDC's Web page
- C compiler
 - How to use it on the machines
 - Basic options
- PBS
 - Basics of PBS
 - Simple script to run job in batch queue both serial and parallel
- OpenMP
 - Basics of shared-memory parallelism
 - Basic constructs
 - Examples in C: simple codes users can run
 - How to compile and run
 - Results
- Using Assure and Guide: possible extension
 - Basic understanding of these tools
 - How are they used on the OpenMP codes, i.e., examples
 - Quick Start User's Guide for Web page
- Insure from Parasoft: one possible extension
 - Basic understanding of tool
 - Evaluation of the software
 - Download and install the software
 - Run tests
 - Write a report

"During my tenure at the ERDC MSRC, I was able to study the current production environment of the center. I learned the basic processes that a user must step through to run serial and parallel codes on High Performance

Computers, as well as the different types of processors (I was granted the opportunity to meet ruby and garnet). I have gained knowledge of basic UNIX, vi, and the Kerberos security system. I was introduced to HTML, and was able to create pages on the areas that I studied this summer.

My overall experience at the ERDC MSRC was advantageous. I learned things that I did not expect to learn in a summer's time. It was motivating that I could create codes and scripts and they actually worked. Being able to work with HTML was gratifying, it was fun, and I have found a passion in it.

I would like to thank you for the opportunity that you gave me to work with you and your staff, such a friendly group of people. I enjoyed the program and the experience. I think that the program could use a little more direction and it would improve greatly."

Joyce's criticism that the program could use a little more direction is appropriate in her case. Based on her interests, the initial assessment that her skills would be a good match with the computational grid effort turned out to be incorrect. In order to adjust and craft a meaningful summer experience for her, she and her mentor established the tasks summarized above. While useful for the center, this effort involved the least amount of interaction with the MSRC and its staff, leaving a justified feeling of "not being a part of things." Her experience would have been significantly strengthened with a more interactive program. The work product she produced was needed and useful, however, and will be deployed on the MSRC's Web site.

Richard Anderson, B.S. Graduate

Richard's plan was to spend the summer investigating software for the Access Grid (AG) collaborative system. This includes the software that comes with the AG distribution, such as Distributed PowerPoint and Virtual Network Computing (VNC), as well as other software that can be used in an AG environment. In particular, Richard was to evaluate the collaborative systems that will be used by Professor Geoffrey Fox in his ERDC Graduate Institute course to be offered at the ERDC MSRC and JSU during the fall 2001 semester. This activity was to have enabled the ERDC MSRC and JSU to more quickly take advantage of the many features of the AG for collaboration and distance education and training.

Richard was able to complete the first and second stages of his plan – a literature search and study to become familiar with the AG technology and the basic operation of the system, an examination of the software systems for collaboration using the AG and, where feasible, to download and try out the software on local MSRC computers. By mid-summer, however, it was evident that neither the ERDC nor JSU AG nodes would be ready for further experimentation. Richard's tasks were expanded to adjust for this change by having him assist with the creation of new Web content for portions of the PET Web site. The delay in deploying the technology that was so crucial to Richard's work plan was understandably disappointing to him, and resulted in a lost opportunity for the MSRC to take advantage of Richard's extensive experience with Web training software (gained in previous summer programs at ERDC). From the MSRC's perspective, however, his internship was productive, as indicated by the observations and information Richard gathered during the summer.

"Access Grid Technology <http://www-fp.mcs.anl.gov/fl/accessgrid/>

The Access Grid (AG) project was a new experience for me. As I looked into the details of its usage, I became more interested. Our (PET) purpose for using AG is for a more advance interactive distance learning teaching mechanism that allowed a student to attend a class without having to be present at the actual location. Thus replacing the former distance learning mechanism TANGO (unsupported). With AG, a student has the same advantages as being in the class itself. It provides video, audio, and some tools for communication between distant students and the lecturer, but unfortunately that was about as far as I could go. The task to set up AG at this site was not finished by the time I arrived for this intern period, so I was unable to see it work. In relation to AG, Dr. Mastin and I decided to change focus to a few tools that would be beneficial to lecturers while using AG. They are Distributed PowerPoint, WinVNC (Virtual Network Computing), and GARNET.

Distributed PowerPoint: <http://www.fp.mcs.anl.gov/fl/accessgrid/dppt.html>

This tool allows the lecturer to present his/her PowerPoint slides to an unmentioned number of clients (students). It involves the usage of a Server and a Master computer which is ideal for use with AG. The PowerPoint presentation is stored on the Master computer, which uses the Server to create a session. The Server creates a session, listens for clients (students) to connect, and starts the PowerPoint application with the presentation provided by the Master computer. The lecturer may then forward the Web "path" of the presentation to the students who may connect at any time. Creating a session is done by saving scripts as .bat files. Unfortunately, the lecturer and the clients will have to edit their .bat files to hold the correct path to the Server.

WinVNC: <http://www.uk.research.att.com/vnc/winhistory.html>

WinVNC allows a user to control another computer from a remote location. All remote computers must have the VNC software installed and running if wished to use remote capabilities. It is very easy to use and is capable for use in windows mode or as a service. The service mode allows a user to connect to a machine that no one has no logged on to. This is very useful when you are out of state and want to log in to your computer (or any other) by remote. VNC has the ability to disable the remote and local keyboard and mouse pointer, therefore preventing another from interfering with your transactions. VNC proved to be a very helpful tool when I installed GARNET on three computers in the PET training room. I was able to download and install GARNET on all three from my own desktop.

GARNET: <http://juniper.ucs.indiana.edu:8080/>

GARNET is a Web conferencing tool created by Dr. Geoffrey Fox to replace the former Tango system. The main interface is a basic classroom environment that allows students to communicate directly and indirectly with one other and the lecturer via chat, ask questions to the lecturer, view slide presentations, and many other things. A voice-over-IP service is also used to transmit real-time audio of the presented class; Dr. Fox uses a HearMe server to handle the audio transmissions. GARNET is user friendly and does not require the client to do more than just register a user name and enroll for a class. I found this very useful when I helped set up for the Graduate Institute course scheduled on the 27th. All transactions, loading, installations, and downloads are done automatically. First-time users will experience a small delay as the browser downloads the proper plug-ins, which is done once (if needed).

Thoughts and Experiences:

My summer here among the people at the ERDC MSRC was a good experience, but I admit a little unproductive. Because the Access Grid system

was not completely setup/installed, Dr. Mastin provided projects for me including the above, along with designing and implementing the Web pages for the CWO and CSM technical areas of PET. My time here was great. Every time I come to the ERDC MSRC (third consecutive summer) I am given a project that involves something I have never heard of or done before. My summer has been a great learning experience and it opened my eyes to more aspects of computing I have never thought of looking into."

David O'Gwynn, M.S. Candidate

David was previously involved with a PET-focused effort entitled "Grid Assembly Enhancements for Chimera Technology." David contributed to this effort by developing a code that will be used to visualize the PM tree data structure used in the Beggar code. As part of this project, David used the Python programming language. Python is an object-oriented, interpreted language that is gaining in popularity. As part of his duties, David taught an informal class on Python, with significant interest from the staff.

An additional project that David worked on is the development of a library to read and write structured grids. The design guidelines for the library included portability between machines with awareness of precision and Endian issues, support for a wide variety of file formats, and revision control and documentation. The end product was an open-source library, complete with documentation. This will also provide a code base for further customer support through the addition of unstructured grid capabilities, future file formats, or the consideration of new technologies such as MPI-I/O.

(Excerpted due to length)

"... Once I was settled in, Nathan Prewitt, my advisor, bounced a few ideas around for research topics on which to spend my summer. Given my predilection for numerical analysis and grid generation, we decided to work on a programming library for numerical grid files. This library would allow both C and Fortran programmers to read, write, and manipulate grids stored in many different types of formats. Now that I am for the most part done with it, I can see that I've gained invaluable programming knowledge. My C programming skills have increased dramatically, and I've acquired a basic understanding of the lex and yacc tools. I've also familiarized myself with the library programming paradigm as well as come to understand the various idiosyncrasies of different supercomputing platforms.

There were many positives to mention about the ERDC MSRC summer intern program. To pick a few, I'd have to start with the exposure level. Being exposed to so many powerful machines and powerful minds is by far the greatest thing the ERDC MSRC has to offer. Not only are these colleagues and coworkers brilliant, they are friendly and ready to help in a moment's notice. There seems to be a kind of familial commitment to excellence that sets this place apart. I've certainly benefited from the experience...I would certainly suggest this program to anyone looking for a high-powered exposure to cutting-edge technology and focused minds committed to excellence in research."

Owen Eslinger, Ph.D. Candidate

Because of Owen's greater experience relative to the other interns, he was paired directly with both an MSRC staff member (Fred Tracy, computational engineer and specialist in groundwater flow) and a staff scientist working in one of the ERDC research laboratories (Stacy Howington). Owen's plan was to install a new subsurface water model developed

at Texas in the ERDC facilities and to build the personal relationships necessary for an expanded collaboration with the ERDC team during his dissertation work.

"I have just completed my master's degree and am working toward my Ph.D. at the Center for Subsurface Modeling (CSM) within the Texas Institute for Computational and Applied Mathematics (TICAM) at the University of Texas in Austin. We are developing an air-water component for our multiphase flow code IPARS. IPARS is the parallel reservoir simulator for CSM and was built to handle oil/water flow. Our new component is based on this previous work. We do not neglect the density of air and we hope that this will be an improvement on other codes based on Richard's equation. I have written a program that allows users to view IPARS output with the graphics package GMS, which is the program used at ERDC. This will allow us to more easily collaborate. I am also trying to get IPARS up and running on a variety of machines at the ERDC MSRC, including the T3E and IBM SP. We hope to eventually compare IPARS with the groundwater codes ADH and FEMWATER. I am hoping to use this work on my dissertation."

Appendix A

Student Application Packet

ERDC MSRC Summer Intern Program

The Major Shared Resource Center (MSRC) at the U.S. Army Engineer Research and Development Center (ERDC) in Vicksburg, MS, has continuing need for technical support services that can be performed by college and university students. Opportunities are available for undergraduate or graduate university students in the fields of computer science, information technology, pre-engineering, all engineering fields, mathematics, chemistry, physics, all pure science-related fields, and all physical science-related fields. Although majors in these fields are preferred, any student with a recognized college major in an appropriate field of study may apply and receive consideration to assist in the wide variety of activities pursued by the ERDC MSRC.

Spending a summer in the ERDC MSRC is a unique opportunity for graduate and undergraduate students in all disciplines to be a part of one of the world's largest computing centers and to have an impact in one of the world's largest and most active computational communities.

The ERDC MSRC

Located in the Information Technology Laboratory (ITL), the ERDC MSRC is one of four Department of Defense (DoD) MSRCs. The four DoD Major Shared Resource Centers, which are supported by the DoD High Performance Computing Modernization Program (HPCMP), serve the high performance computing (HPC) needs of engineers and scientists throughout the DoD.

ERDC is the premier research and development laboratory complex for the U.S. Army Corps of Engineers. ERDC does critical research in the Tri-Service Reliance areas of Civil Engineering, Environmental Quality, and Environmental Sciences. Originally established as an Army Supercomputer Center in 1989, ERDC became the first HPC MSRC in 1993 as part of the DoD HPCMP. The ERDC MSRC utilizes Computer Sciences Corporation (CSC) of La Jolla, CA, as the prime integration contractor.

The ERDC MSRC operates multivendor HPC computational systems that address DoD user requirements for hardware, software, programming environments, and training. ERDC is consistently highly ranked in lists of the most powerful computing sites in the world. International access to the ERDC MSRC HPC systems is provided through the Defense Research and Engineering Network (DREN) and the Internet.

Scope of Work

Work performed will have direct impact on the operations of the center and on the ability of DoD scientists and engineers to accomplish their mission in support of the warfighter. Specific activities may involve the following:

- a. Web site support and development

- b. Visualization and analysis of scientific data
- c. Migration, tuning, and porting of application codes among parallel HPC machines
- d. Support and development of enhanced user applications
- e. System and network hardware support
- f. Technology studies (for example, tools for collaboration and communication, etc.)

Students will be paired with mentors during their internship who will oversee their daily activities and ensure a meaningful experience. Students will be supporting efforts with direct user relevance through partnerships with functional groups within the MSRC such as the Programming Environment and Training (PET) program technical leads, the Scientific Visualization Center, the Computational Science and Engineering Group, Outreach, etc.

Applying for a Position

The number of students the HPC Summer Intern Program can accommodate is limited, and selections will be competitive based on qualifications of the applicant and opportunities available at the time. Selection will also support the host agency's goals to recruit and develop traditionally under-represented groups into the high performance computing and technology fields.

An application packet consists of the following information:

- A completed application form (in this packet)
- At least one letter of recommendation from a faculty member or university official (and a statement in that letter that the applicant does intend to return to school in the next semester to the best of the faculty member's knowledge)
- A copy of your transcript

Selection will be determined based upon factors such as major (and relevance to currently available projects), grade point average (GPA), student classification, and work experience.

Send your completed application, including all other required documents, to the following address:

U.S. Army ERDC MSRC
ATTN: John E. West, CEERD-IH, TL112
3909 Halls Ferry Road
Vicksburg, MS 39180

Questions concerning this application process may be directed to John West by e-mail at John.E.West@erdc.usace.army.mil.

Technical positions at the ERDC MSRC are available via two mechanisms. If your university has an existing relationship with the ERDC MSRC PET program, the MSRC may at its discretion choose to pursue a focused effort with the university to fund the summer internship. If your university is not presently affiliated with the PET program, the MSRC may choose to pursue either a focused effort relationship or fund the position

via a purchase order to the university. In any case, the ERDC MSRC will fund the university through CSC, and the university will be responsible for disbursing funds to the student, as well as managing the tax implications of the relationship.

Pertinent Information and Dates

1. Applications must be complete and at the ERDC MSRC no later than 1 May 2001.
2. Internships generally start on 1 June; precise ending dates, hours per week, and work period are negotiable.
3. Applicants must be U.S. citizens and must be able to successfully complete a security process (NAC) as a condition of acceptance and continued participation in the program.
4. Eligibility is dependent upon a minimum overall GPA of 3.0 for undergraduate students and 3.2 for graduate students. All credits/hours used to determine appropriate maximum rate **MUST** be applicable to your major and curriculum. Rates are shown below.
5. Your classification on your application must be supported by your transcript, i.e., freshman, sophomore, etc. Since you will be evaluated on the credentials of your application only, and the pay rate for which you are eligible is based on your classification, do not mistakenly project your classification beyond that of which your transcript supports.
6. If you are graduating from an undergraduate curriculum and are planning to further your education in the fall semester, you must furnish evidence to substantiate this intention.

Classification and Compensation

The following table sets forth the minimum conditions that determine the level of your internship. These levels are used to determine compensation.

<i>Level</i>	<i>Minimum eligibility</i>
Intern 1	At least 1 full year of academic study (30 hours)
Intern 2	At least 3 full years of academic study (90 hours)
Intern 3	Completed requirements for a B.S. degree
Intern 4	Completed requirements for an M.S. degree

The pay levels below establish the appropriate pay for summer interns for Year 2001.

<i>Level</i>	<i>Compensation</i>
Intern 1	\$8.77/hour
Intern 2	\$9.93/hour
Intern 3	\$12.50/hour
Intern 4	\$16/hour

Students will be limited to 40-hour weeks. In addition to wage compensation, summer interns will receive an allowance for living expenses and are eligible to be reimbursed for one trip to and one trip from Vicksburg. Living expenses are reimbursed at Federal per diem rates for Vicksburg, currently \$55/day for lodging and \$30/day for meals. Students driving to Vicksburg will be reimbursed at the rate of \$0.34/mile based on the Federal Table of Distances from their university or hometown, as agreed upon before the start of the internship.

Reimbursement for interns at the full per diem rate only applies to applicants participating in the summer program for less than 4 months. Reimbursement for stays beyond 4 months may be made at a lower rate. This rate will be established at the beginning of the internship, or re-established at such time that the student's intent to extend the initial stay is made clear and accepted by the ERDC MSRC. The new rate will take effect immediately.

Application for Summer Internship at the ERDC MSRC

1. Name of Student: _____
2. Social Security Number: _____
3. Are you a U.S. Citizen? (check one) ☐ Yes ☐ No
If no, indicate country: _____
4. University or college name: _____
Type of institution: (check one) ☐ 2 Year ☐ 4 Year
5. Student's mailing address at college: _____

Student's telephone number at college: _____
6. Student's permanent mailing address: _____

Student's permanent telephone number: _____

7. Degree being pursued (e.g.: B.S., M.S., ...): _____
8. Major/field of study: _____
(Coursework must support your major and major must be shown on school record. Otherwise, applicant's major is considered to be "General Studies.")
9. Present classification (e.g.: Freshman): _____
If Master's or Ph.D. candidate, provide area of specialty: _____

10. Total hours completed to date: _____
Type of hours: (check one) ☐ Semester ☐ Quarter
11. Number of hours currently enrolled in: _____
Type of hours: (check one) ☐ Semester ☐ Quarter
12. Overall grade point average (e.g.: 3.45/4.0): _____
***** TO BE CONSIDERED, YOU MUST ATTACH A COPY OF YOUR COMPLETE TRANSCRIPT(S) REFLECTING YOUR CUMULATIVE AVERAGE.**
13. Anticipated graduation date: _____
14. Academic honors, achievements, or recognition: _____

15. Indicate hourly rate proposed (see tables in Information Sheets): _____
16. Do you have immediate family members working at ERDC or at the ERDC MSRC? ☐ Yes ☐ No
If yes, list family members and their relationship (e.g.: mother, etc.)

-
-
17. Have you ever worked for or at ERDC or the ERDC MSRC? ☐Yes ☐No
If yes, list dates, positions, and name of supervisor:

-
-
18. Proposed schedule (1 June is the recommended start date; the end date is flexible based on your personal and university schedules):

Start: _____ End: _____

Proposed hours/day (if other than 8, please explain):

Anticipated absences:

-
19. Invitation to self-identity – the ERDC MSRC maintains a deep commitment to developing relationships that enhance the participation of traditionally under-represented communities in high performance computing. If you wish to identify yourself as part of a minority or under-represented population, you may do so here. Choosing not to accept this invitation will not negatively impact your candidacy or chances of selection: _____

20. Your signature and date: _____